Two variables are statistically associated when they occur frequently together, or change together. Scientists use the term "risk factor" for a condition, behavior or other variable which has been statistically associated with a specific disease; a risk factor may or may not be causally related to the disease. A fair statement of the current state of scientific knowledge is that cigarette smoking is a risk factor for some kinds of human lung cancer.

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Cigarette smoking and lung cancer have often, and for a long time, been described as cause and effect. Advocates of this view have used as their major source of support the statistical calculations from epidemiological or population studies of smokers and nonsmokers. To a much lesser extent, they rely on laboratory research on animals, the chemical analyses of and tests on tobacco smoke and its condensate, and other human evidence from autopsy studies and clinical impressions. A brief overview of the nature of epidemiological evidence because of its paramount role in the issue of causation, serves to place it in proper scientific perspective. A discussion of the industry's position on the question of whether cigarette smoking causes lung cancer also follows.

Epidemiologists study the patterns of disease occurrence or deaths in selected groups of people and then calculate disease or death rates by reported causes using mainly hospital records and death certificates. With this information they attempt to identify conditions, behaviors, or other factors in the lives of the subjects which may be related to these disease outcomes. Basically, epidemiologists focus on detecting statistical associations between factors and disease, and measuring the strength of these associations. To say that a statistical association exists between a factor and a disease means that the disease and the factor occur frequently together, or change together. The report of a

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statistical association between a factor and a disease does not mean that a cause and effect relationship has been established.

In fact, statistics can never establish causation -- a well-recognized and accepted scientific principle. However, statistical associations have value in that they suggest avenues for further research and they raise questions about disease causation which can be answered only on the biological or mechanistic level.

Epidemiologists and other scientists use the term "risk factor" for a condition, behavior or other variable which has been statistically associated with a specific disease; a risk factor may or may not be causally related to the disease. In addition to this meaning, the term risk factor is often used by scientists to refer to a factor which is being investigated as a possible cause of the disease.

Cigarette smoking, along with other conditions or behaviors, such as dietary insufficiencies, family history of lung cancer, age, occupation, place of residence and genetic make-up, has been statistically associated with some kinds of human lung cancer. It is worth noting that lung cancer is not one disease but refers to the many types of cancer of the lung which differ in, among other things, their microscopic appearances, growth rates, treatment

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responses, and likelihood of survival or cures. Hence, cigarette smoking is a risk factor for some types of human lung cancer but is not necessarily a cause.

To describe cigarette smoking as a risk factor is supported by the current state of scientific knowledge. This description acknowledges that there is some evidence from epidemiology and other disciplines which is consistent with a causal role for smoking in the production of some types of human lung cancer, but it also recognizes the limitations of, the inconsistencies in, and the gaps in this evidence. Consequently, the available scientific evidences does not rise to the level of establishing scientifically a causal relationship. Three facts supporting this view follow. First, despite years of effort and considerable expense, no human-type lung cancer has been produced in animals as a result of the inhalation of whole, fresh tobacco smoke. Second, no constituent of tobacco smoke as found in the smoke has been shown to cause lung cancer. Third, no biological mechanism by which tobacco smoke might cause lung cancer has been elucidated by science. There are important unresolved questions remaining before a causal relationship can be scientifically proven or rejected.

Whether cigarette smoking causes lung cancer or not is clearly a question that can only be resolved by further research.

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